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REMARKS

This paper is responsive to any paper(s) indicated above, and is responsive in any other manner indicated below.

DRAWING OBJECTIONS/SPECIFICATION ADJUSTED

With regard to the sections numbered "2-3" on page 2 of the Detailed Action, appropriate locations of Applicant's specification have been amended to delete unillustrated reference numerals, and to include mention of reference numeral(s) previously only illustrated. As the following is believed to obviate all the listed concerns, reconsideration and withdrawal of the objection to the drawings are respectfully requested. It is respectfully noted that no drawing changes are required in view of the amendments to the specification.

ABSTRACT OBJECTION - REPLACEMENT ABSTRACT SHEET

The abstract has been objected to because of the Office Action concerns listed within the section numbered "5" on page 3 of the Detailed Action. As the attached replacement abstract sheet is believed to be of proper form, reconsideration and withdrawal of the objection to the abstract, are respectfully requested. In the event that the present replacement abstract is itself found not to be of proper form, the Examiner is herein authorized to amend to a suitable replacement abstract. With respect to any past, present or any ultimately implemented Abstract or amendment thereof, Applicant would like to reiterate and embrace the 37 CFR 1.72(b) provisions that "The abstract will not be used for interpreting the scope of the claims."

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DISCLOSURE AMENDED

The disclosure has been objected to because of the Office Action concerns listed within the section numbered "6" on page 3 of the Detailed Action. As the disclosure has been carefully reviewed and has been amended where appropriate in order to address each of the Office Action listed concerns, reconsideration and withdrawal of the objection to the disclosure are respectfully requested.

Any spelling, idiomatic, grammatical and/or other informality noted during further review of the disclosure/specification have been corrected.

PENDING CLAIMS

Claims 1-8 were pending, under consideration and subjected to examination in the Office Action. Appropriate claims have been amended, canceled and/or added (without prejudice or disclaimer) in order to adjust a clarity and/or focus of Applicant's claimed invention. That is, such changes are unrelated to any prior art or scope adjustment and are simply refocused claims in which Applicant is present interested. At entry of this paper, Claims 1-9 will be pending for further consideration and examination in the application.

'101 REJECTION RE NON-STATUTORY SUBJECT MATTER - TRAVERSED

Claims 1-7 have been rejected under 35 USC 101 as being directed to non-statutory subject matter. Applicant respectfully traverses as follows.

A claim for just a computer program, for example:

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"A. A computer program, which when executed, causes a machine to:
analyze a flow; and
calculate a strain."

would not be considered statutory subject matter, because there is no physical entity claimed, i.e., a "computer program" is not a physical (i.e., tangible) entity. However, once embodied via a physical entity, such as, for example:

"A. A computer-readable medium embodying a computer program,
which when executed, causes a machine to:
analyze a flow; and
calculate a strain."

would be considered statutory subject matter, because there is a physical entity (i.e., a computer-readable medium, such as a disk) explicitly claimed. In re Gary M. Beauregard, et al., Case No. 95-1054, Fed. Cir., 12 May 1995 ("Connector [sic ?] Programs Embodied in a Tangible Medium ...are patentable subject matter under 35 USC § 101...").

Regarding independent claim 1 (and claims 2-4 dependent therefrom), such claim explicitly claims "A design support apparatus". Because an "apparatus" is a physical or tangible entity (e.g., a machine, computer, etc.), it is respectfully submitted that it follows that claim 1 is directed to statutory subject matter. Even assuming arguendo that a remainder of claim 1's text is directed to a program, such program would be embodied within the claimed tangible "apparatus" entity, and accordingly, would be directed to statutory subject matter.

Regarding clarified independent claim 5 (claims 6 and 7 have been canceled), such claim explicitly claims "A computer-readable medium having a program readable by a computer". Because a "medium" is a tangible entity (e.g., a disk, etc.)

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as shown by In re Gary M. Beauregard, et al., it is respectfully submitted that it follows that claim 5 is directed to statutory subject matter.

Other portions of the Office Action comments mentioned the claimed "means". Regarding the claimed "means", the last paragraph of 35 USC 112 specifically states:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof ...

Applicant respectfully submits that the "means" portions of the rejected claims are written in a proper means-plus-function type of format.

Based upon the foregoing, reconsideration and withdrawal of the '101 rejection of the above-referenced claims are respectfully requested.

REJECTION UNDER 35 USC '103

The 35 USC '103 rejection of claims 1-8 as being unpatentable over Saito et al. (U.S. Patent 6,136,235) in view of Fujita et al. (U.S. Patent 5,035,598) is respectfully traversed. However, such rejections have been rendered obsolete by the present clarifying amendments to Applicant's claims, and accordingly, traversal arguments are not appropriate at this time. However, Applicant respectfully submits the following to preclude renewal of any such rejections against Applicant's clarified claims.

All descriptions of Applicant's disclosed and claimed invention, and all descriptions and rebuttal arguments regarding the applied prior art, as previously submitted by Applicant in any form, are repeated and incorporated hereat by reference. Further, all Office Action statements regarding the prior art rejections are

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respectfully traversed. As additional arguments, Applicant respectfully submits the following.

Unrelated to any prior art rejection, claims 6-7 have now been canceled without prejudice or disclaimer, thus rendering this rejection of such claims obsolete at this time. Patentability of remaining ones of the rejected claims are supported as follows.

In order to properly support a §103 obviousness-type rejection, the reference not only must suggest the claimed features, but also must contain the motivation for modifying the art to arrive at an approximation of the claimed features. However, the cited art does not adequately support a §103 obviousness-type rejection because it does not, at minimum, disclose (or suggest) the following limitations of Applicant's clarified claims.

Applicant's disclosed and claimed invention is directed arrangements (e.g., apparatus, methods, etc.) for supporting thermosetting resin molding, i.e., where a flow analyzer, for example, looks at a reaction rate, heat release, etc. It is respectfully noted that thermosetting resin is explicitly recited a number of times within Applicant's claims. In contrast, both the Saito et al. and Fujita et al. references appear directed to thermoplastic arrangements. Thermosetting and thermoplastic are two different worlds, and accordingly, it is respectfully submitted that no combination of Saito et al. and Fujita et al. could have disclosed or suggested Applicant's claimed invention, and especially Applicant's flow analyzer.

In addition to the foregoing, the following additional remarks from Applicant's foreign representative are also submitted in support of traversal of the rejection and patentability of Applicant's claims.

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The present invention uses a thermosetting resin to define the invention, however, since the thermosetting resin is typically a representative of a mold resin, the material does not have a specific feature in itself.

In the present invention, although a term "reaction rate model" is not used in the specification of the present invention, the reaction rate models are expressed by the equations 1-5. These models exhibit the maximum value of the heat release rate during the reaction. As shown in Applicant's Fig.7, the reaction rate A shows a characteristic to increase with the lapse of time and become saturated toward 1 (a reaction rate at the end of reaction).

Applicant explains the reaction rate further in detail. The thermosetting resin changes into a three-dimensional molecular structure by the chemical reactions with the base resin, curing agent, accelerator, etc. At this time, it is reaction rate A that indicates how much the reaction proceeds. Specifically, the initial state before the chemical reaction begins is indicated by $A=0$, while a state after the chemical reaction is indicated by $A=1$. That is, A is a dimensionless number that changes a range from 0 to 1. The change rate with respect to the reaction rate A is $\partial A / \partial t$, and such shows the reaction rate.

One feature of the present invention is in that the above-described reaction rate models are employed in Applicant's invention. A novel feature of the present invention is in that the reaction rate indicated by the models is used, and changing components of the property values of the thermosetting resin (such as viscosity η , the coefficient of elasticity $E(T)$, and the linear curing strain components ϵ_1 etc., that changes with the lapse of time) are basically replaced by the change of the reaction rate to express it as a function of the reaction rate.

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Regarding effects of the present invention, in the field of resin flow analysis in the process of resin molding, both the packing behavior and a residual void can be estimated with sufficiently high precision at this state, by means of a three-dimensional analysis system or the like. However, the analysis system does not include calculation of the change of properties as to the strain component, or coefficient of elasticity after gelling, that are necessary for strength analysis (stress analysis) of the product. Therefore, the disadvantaged analysis system will not directly be applied to estimation of the product strength. The present invention can solve this problem.

Specifically, a reaction rate A was found as a common parameter that connects the flow analysis and the strength analysis (stress analysis), where each has been carried out independently of the another, and calculation of the properties necessary for the strength analysis (stress analysis) is carried out at the flow analysis side (and residual strain (stress) estimation unit side) that is necessary for strength analysis until the end of molding process. Then the calculated data is given to the strength analysis side (stress analysis side) so that the strength of the resin mold products using the thermosetting resin can be estimated with a higher precision.

Regarding arguments in comparison with the cited references, the invention of Saito relates to a method of predicting a deformation amount during the injection molding of plastic and a system therefor. In a background simulation program, the behavior of the anisotropy of the shrinkage factor is not considered. In order to solve this problem, in the simulation system where the behaviors of the molten resin at each step of filling in the mold tool, keeping the pressure and cooling, are

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predicted based on the base equation formulated according to the finite element method, and shrinkage rate in the direction of thickness and planner is predicted based on the volume shrinkage factor of the anisotropy shrinkage obtained during the prediction at each of the steps, the warp deformation is predicted based on the shrinkage rate obtained from the following equations;

[Equation 1] $\epsilon Z = A + B \cdot eV$

[Equation 2] $\epsilon P = (eV - \epsilon Z)/2$

wherein, ϵZ : a shrinkage factor in the direction of thickness, ϵP : a shrinkage factor in the planar directions, eV : a volume shrinkage factor, A, B : shrinkage coefficients

In the specification of Saito (U.S.P.6,136,235), it is not clearly described what type of resin is used in such invention. However, assuming from the equations given in Saito, it seems that the thermoplastic resin may be the target, wherein no reaction of resin occurs. In contrast, in a case of thermosetting resin, which is used in Applicant's Invention, a change of reaction rate according to the progress of the reaction effects warp or elasticity coefficient. Therefore, it is necessary to indicate the property of the resin with a function of the reaction rate A , and calculate the residual warp after thermal shrinkage so as to analyze the molded products. Thus, invention of Saito and Applicant's invention are completely different from one another.

The invention of Fujita is directed to an optimum molding condition setting system, comprising molten material flow analysis means, analysis result evaluating means, molding defect eliminating means for inferring the causes of the molding defect, and for selecting the corrective measures to set an optimum molding condition when inject-molding machine is used for metal molding of the molten

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materials, such as resin. Fujita does not explicitly define the type of resin. However, Fig. 2 and Fig 4 disclose countermeasures in case that the flowing property is low, that is, a barrel of the heating cylinder is heated up, or the metal mold is heated. Such countermeasures are possible only with the thermoplastic resin which does not cause a reaction, and has a property that the viscosity is lowered at a higher temperature.

In contrast, for thermosetting resin handled in Applicant's invention, the reaction goes faster at a higher temperature, and therefore the viscosity will be higher. Therefore the countermeasures disclosed by Fujita in Fig. 2 or Fig. 4 are not applicable. Further, Fujita (U.S. Patent 5,035,598) merely provides a flow chart showing that structure strength analysis are to be carried out, but he does not disclose any specific analysis method. Thus, Fujita does not disclose or suggest the method of the present invention.

As a result of all of the foregoing, it is respectfully submitted that the applied art (taken alone and in the Office Action combinations) would not support a '103 obviousness-type rejection of Applicant's claims. Accordingly, reconsideration and withdrawal of such '103 rejection, and express written allowance of all of the '103 rejected claims, are respectfully requested.

EXAMINER INVITED TO TELEPHONE

The Examiner is herein invited to telephone the undersigned attorneys at the local Washington, D.C. area telephone number of 703/312-6600 for discussing any Examiner's Amendments or other suggested actions for accelerating prosecution and moving the present application to allowance.

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RESERVATION OF RIGHTS

It is respectfully submitted that any and all claim amendments and/or cancellations submitted within this paper and throughout prosecution of the present application are without prejudice or disclaimer. That is, any above statements, or any present amendment or cancellation of claims (all made without prejudice or disclaimer), should not be taken as an indication or admission that any objection/rejection was valid, or as a disclaimer of any scope or subject matter. Applicant respectfully reserves all rights to file subsequent related application(s) (including reissue applications) directed to any/all previously claimed limitations/features which have been subsequently amended or cancelled, or to any/all limitations/features not yet claimed, i.e., Applicant continues (indefinitely) to maintain no intention or desire to dedicate or surrender any limitations/features of subject matter of the present application to the public.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are now in condition for allowance. Accordingly, early allowance of such claims is respectfully requested.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR 1.136. Authorization is herein given to charge any shortage in the fees, including extension of time fees and excess claim fees, to Deposit Account No.

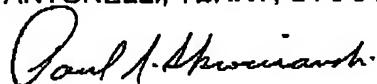
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01-2135 (Case No. 566.42987X00) and please credit any excess fees to such
deposit account.

Respectfully submitted,

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ATTACHMENTS:

replacement Abstract sheet